

WHAT IS CLAIMED IS:

1. A connection unit for electrically connecting a DUT mounting board, on which an IC socket is mounted, with a testing apparatus for testing an electronic device inserted into said IC socket, said connection unit comprising:

a holding substrate provided to face said DUT mounting board; and

a connection-unit-side connector, which is provided on said holding substrate to be able to change a position of said connection-unit-side connector on said holding substrate, for connecting to a performance-board-side connector which said DUT mounting board comprises.

2. The connection unit as claimed in claim 1, wherein said holding substrate comprises, in case a position of said performance-board-side connector varies according to kinds of said DUT mounting board, a means for moving said connection-unit-side connector to a position corresponding to said varied position of said performance-board-side connector.

3. The connection unit as claimed in claim 1 or 2, wherein said connection-unit-side connector is detachable from said holding substrate, so that said connection-unit-side connector detached from said holding substrate may be re-attached to other holding substrate on which a performance-board-side connector is provided in a different position.

4. The connection unit as claimed in claim 1, wherein said connection-unit-side connectors are plural, and distances

between said plurality of connection-unit-side connectors can be changed on said holding substrate.

5. The connection unit as claimed in claim 1 or 2, wherein said connection-unit-side connector is provided in order that said distance can be changed, with regard to said position of said IC socket where said connection unit and said DUT mounting board are connected.

6. The connection unit as claimed in claim 1 or 2, further comprising a connection cable, of which an end is fixed to said connection-unit-side connector, for electrically connecting said connection-unit-side connector and said testing apparatus, wherein said holding substrate has a penetrating hole, of which a diameter admits said connection-unit-side connector, at a position to hold said connection-unit-side connector.

7. The connection unit as claimed in claim 1 or 2, further comprising a connection cable, of which an end is fixed to said connection-unit-side connector, for electrically connecting said connection-unit-side connector and said testing apparatus, wherein said holding substrate has a penetrating hole, through which said connection cable passes, between a plurality of positions to be able to change said connection-unit-side connector.

8. The connection unit as claimed in claim 1 or 2, wherein said holding substrate holds said connection-unit-side connector to be able to change said position in either a radial direction or an axial direction, taking a position of said IC

socket, where said connection unit and said DUT mounting board are connected, as a center.

9. The connection unit as claimed in claim 8, wherein cross sections of said IC socket and said connection-unit-side connector are rectangular respectively at a surface substantially parallel to said holding substrate, and said holding substrate holds said connection-unit-side connector so that a longer side of said cross section of said connection-unit-side connector faces a nearest side of said cross section of said IC socket, in case said connection-unit-side connector is positioned most closely to said IC socket, with regard to a direction of diameter.

10. The connection unit as claimed in claim 1 or 2, wherein said holding substrate comprises a plurality of connector positioning members, respectively provided at predetermined positions on said holding substrate, for designating positions where said connection-unit-side connector may be changed.

11. The connection unit as claimed in claim 9, wherein said connection-unit-side connector comprises either groove or protrusion, one of which is inserted into one another, each of said plurality of connector positioning members comprises corresponding one of groove or protrusion, and said holding substrate holds said connection-unit-side connector by engaging said groove or protrusion of said connection-unit-side connector with said groove or protrusion of said connector positioning member.

12. The connection unit as claimed in claim 1, wherein a plurality of IC sockets is placed on said DUT mounting board, and

said connection unit comprises a plurality of connection-unit-side connectors corresponding to said plurality of said IC sockets,

whereby said holding substrate holds each of said plurality of connection-unit-side connectors so that a position of said connection-unit-side connector may be changed.

13. The connection unit as claimed in claim 1 or 2, further comprising:

a small diameter performance board positioning member, provided on said holding substrate, for designating a DUT mounting board of which a diameter is smaller than a predetermined diameter, and

a large diameter performance board positioning member, provided at a position farther from said IC socket than a position of said small diameter performance board positioning member on said holding substrate, for designating a DUT mounting board of which a diameter is larger than a predetermined diameter.

14. A DUT mounting board for electrically connecting an electronic device and a testing apparatus for testing said electronic device, said DUT mounting board comprising:

an IC socket for holding said electronic device,
a socket substrate for holding said IC socket,
a high-frequency signal connector for supplying a test signal from said testing apparatus to said IC socket, and
a low-frequency signal connector, provided farther from said IC socket than a position of said high-frequency signal

connector, for supplying a test signal of which a frequency is lower than said test signal which said high-frequency signal connector provides from said testing apparatus to said IC socket.

15. The DUT mounting board as claimed in claim 14, wherein said socket substrate comprises:

a single-sided hole for high-frequency which is electrically connected to said high-frequency signal connector and extends from a bottom surface, where said high-frequency signal connector is provided on said socket substrate, to an intermediate layer not reaching a top surface of said socket substrate, and

a through hole for low-frequency which is electrically connected to said low-frequency signal connector, is provided at a peripheral portion of said socket substrate with regard to said single-sided hole for high-frequency, and extends penetratively from a bottom surface, where said low-frequency signal connector is provided on said socket substrate, to a top surface on which said electronic devices are placed.

16. The DUT mounting board as claimed in claim 15, wherein said socket substrate further comprises:

a through hole for high-frequency which is electrically connected to a high-frequency terminal pin of said electronic device and extends penetratively from said top surface to said bottom surface of said socket substrate, and

an single-sided hole for low-frequency which is electrically connected to a low-frequency terminal pin of said electronic device, is provided at a peripheral portion of said socket substrate with regard to said through hole for high-frequency, and extends from said top surface to an

intermediate layer not reaching said bottom surface of said socket substrate.

17. The DUT mounting board as claimed in claim 16, wherein said socket substrate is a multi-layer board in which a plurality of wiring layers are formed, said socket substrate further comprising:

a low-frequency signal wiring, formed on one of said layers, for electrically connecting said through hole for low-frequency with said single-sided hole for low-frequency, and

a high-frequency signal wiring, formed on a layer lower than said layer on which said low-frequency signal wiring is formed, for electrically connecting said single-sided hole for high-frequency with said through hole for high-frequency.

18. A DUT mounting board for electrically connecting an electronic device and a testing apparatus for testing said electronic device, said DUT mounting board comprising:

a socket substrate having a plurality of layers on which wirings are formed respectively, and

a connector, provided on a bottom surface of said socket substrate, for supplying a test signal from said testing apparatus to said electronic device,

wherein said socket substrate comprises:
a signal wiring, formed on a layer of said socket substrate, for transferring said testing signal to said electronic device,

a plurality of upper layer ground (GND) wirings, formed on an upper layer than said signal wiring, for being connected to a ground potential,

a plurality of lower layer GND wiring, formed on a lower layer than said signal wiring, for being connected to said ground potential, and

an single-sided hole, extending from a bottom surface to a top surface of said socket substrate, for electrically connecting said connector and said signal wiring,

whereby a horizontal distance between at least one of said upper layer GND wiring and said single-sided hole is greater than a horizontal distance between at least one of said lower layer GND wiring and said single-sided hole.

19. The DUT mounting board as claimed in claim 18, wherein a horizontal distance between a first one of said upper layer GND wirings closest to said signal wiring and said single-sided hole is substantially the same as a horizontal distance between said lower layer GND wiring and said single-sided hole, and is smaller than a horizontal distance between a second one of said upper layer GND wirings and said single-sided hole.

20. The DUT mounting board as claimed in claim 18, wherein said single-sided hole extends from a bottom surface of said socket substrate to an intermediate layer not reaching a top surface of said socket substrate.

21. A DUT mounting board for electrically connecting an electronic device and a testing apparatus for testing said electronic device, said DUT mounting board comprising:

a socket substrate having a plurality of layers on which wirings are formed respectively, and

a connector, provided on a bottom surface of said socket substrate, for supplying a test signal from said testing apparatus to said electronic device,

wherein said socket substrate comprises:

a signal wiring, formed on a layer of said socket substrate, for transferring said testing signal to said electronic device,

an single-sided hole, extending from a bottom surface of said socket substrate to an intermediate layer not reaching a top surface of said socket substrate, for electrically connecting said connector and said signal wiring, and

a plurality of GND wirings for being connected to a ground potential, which are formed at one of said layers excluding said signal wiring except a place where said single-sided hole is formed, in case said single-sided hole extends to said top surface of said socket substrate.

22. A probe card for electrically connecting an electronic device with a testing apparatus for testing said electronic device, said probe card comprising:

a probe pin for being electrically connected to a terminal of said electronic device,

a probe board for holding said probe pin,

a high-frequency signal connector for supplying a test signal from said testing apparatus to said probe pin, and

a low-frequency signal connector, provided farther from said probe pin than a position of said high-frequency signal connector, for supplying a test signal, of which a frequency is lower than said test signal supplied to said probe pin by said high-frequency signal connector.

23. A DUT mounting board for interfacing a test signal used for testing DUT in an IC testing apparatus, comprising:

a multi-layer printed circuit board, in which a first one of both ends of an internal layer wiring pattern is connected to a through hole, and a second one of said both ends of said internal layer wiring pattern is connected to an SVH (Surface Buried Via Hole), and

upper and lower ground layers, between which said internal layer wiring pattern is interposed,

wherein said ground layers are distanced from a stub part of said SVH in order to reduce deterioration of transfer properties according to said stub part,

whereby said SVH, internal layer wiring pattern and through hole form wiring connection between top and bottom surfaces of said printed circuit board.

24. The DUT mounting board as claimed in claim 23, comprising: a plural layer printed circuit board comprising an internal layer wiring pattern and a ground layer, wherein

at least two said plural layer printed circuit boards are bonded, and through holes, connected to one of said internal layer wiring patterns, are formed to produce a multi-layer printed circuit board, and

said SVH, which connects an end of said internal layer wiring pattern, is formed out of said through holes,

so that predetermined characteristic impedance is formed according to said width of said internal layer wiring pattern and said distance between said upper and said lower ground layers.

25. A device interfacing part of IC testing apparatus for interfacing electrical signals flowing between a test head and

a DUT, comprising a DUT mounting board for interfacing electrical signals used for testing DUT, said DUT mounting board comprising:

a multi-layer printed circuit board, in which a first one of both ends of an internal layer wiring pattern is connected to a through hole, and a second one of said both ends of said internal layer wiring pattern is connected to an SVH, and

upper and lower ground layers, between which said internal layer wiring pattern is interposed, and wherein said ground layers are distanced from a stub part of said SVH (Surface Buried Via Hole) in order to reduce deterioration of said transmission characteristic according to said stub part,

whereby said SVH, internal layer wiring pattern, and through hole form wiring connection between top and bottom surfaces of said printed circuit board.